The Bulletins are published weekly throughout the school year (thirty issues) to aid teachers and students in keeping abreast of geography behind current news events.

GEOGRAPHIC SCHOOL BULLETINS

of

The National Geographic Society

WASHINGTON 6, D. C.

The National Geographic Society is a non-profit educational and scientific Society established for the increase of geographic knowledge and its popular diffusion.

VOLUME XXIX | October 23, 1950 | NUMBER 4

1. Inca Walls Endure in 'Quake-Stricken Cusco
2. News from Australia: Lake Eyre Full of Water
3. 950 Years of Transatlantic Trail Blazing
4. Proper "Farming" to Assure Sequoia's Future
5. Kashmir Floods Spare Wool-Producing Goats

VOLKMAR WENTZEL

A KASHMIRI LOOMSMAN WEAVES GOAT WOOL (Bulletin No. 5) INTO A RUGLIKE WALL HANGING

Bulletin No. 1, October 23, 1950

Inca Walls Endure in 'Quake-Stricken Cusco

CUSCO, still rebuilding after last spring's disastrous earthquake, is probably South America's oldest existing city of importance. Historians believe it was founded more than 900 years ago. It lies high in the *altiplano* of south central Peru, at an elevation of 11,155 feet.

Cusco's name signifies navel, in the sense of hub of the universe—which it was to the Inca Empire. Although counting only about 53,000 residents at the time of the recent earthquake, it was a gold-trimmed metropolis of 200,000 when overrun in 1533 by Spanish conquistadores.

National Geographic Sponsored Peruvian Expeditions

While Spanish tile-roof-and-stucco architecture prevails in modern Cusco, a very sturdy and distinguishing feature of the city is the mortarless masonry of the Inca and pre-Inca builders.

(The National Geographic Society sponsored expeditions to Cusco, Machu Picchu, and other citadels of ancient Incaland jointly with Yale University in 1912, 1914, and 1915 under the leadership of Dr. Hiram Bingham. The 1912 party made a careful topographical survey of the two-mile-high valley in which Cusco lies. The October, 1950, issue of the *National Geographic Magazine* contains Kip Ross's report on the region.)

Old Inca walls often were made the foundations for Cusco's comparatively new homes and business houses, as well as for Spanish churches (illustration, inside cover). The earthquake badly damaged the Spanish parts of many buildings, but did not budge the Inca portion. Oldest and most impressive of the ancient walls are those in which massive flat-faced stones, having as many as a dozen angles on their sides and backs, were matched and fitted together without mortar so precisely that a knife blade cannot be inserted in the dry joints.

Such artisanry required infinite patience and time. A strong belief persists locally that the Incas knew how to soften granite temporarily by using the juice of herbs, so that it could be shaped or cut into any form.

The Mecca of Incaland

Developed somewhat later were the walls of six-sided stones, and those of large rectangular stones polished smooth and often built in an arc. The wall of the Temple of the Sun is of this curving form.

For 500 years Cusco was the Mecca of Incaland. Its sacred quarter, the Coricancha, or Enclosure of Gold, centered in the Temple of the Sun and included separate shrines dedicated to the moon, lightning, rainbow, Venus, and the Pleiades. Early Spanish writers have left fabulous accounts of the pure gold embellishments these buildings contained.

On the heights above Cusco, the monumental fortress of Sacsahuaman spreads its walls in many angles of massive, dovetailed stonework. At near-by Pisac and Ollantaitambo are other hillside structures of the Inca dry-wall skill. The ancient forts and homes commanded hilltops for safety,

ENTERED AS SECOND CLASS MATTER APRIL 27, 1943, POST OFFICE, WASHINGTON, D. C., UNDER ACT OF MARCH 3, 1879.
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KIP ROSS

PART OF THE INCA TEMPLE OF THE SUN SERVES AS A CURVED FOUNDATION FOR SPANISH-BUILT SANTO DOMINGO MONASTERY. 1950'S EARTHQUAKE DAMAGED ONLY THE NEWER PART (Bulletin No. 1)

News from Australia: Lake Eyre Full of Water

ORDINARILY, reports that a lake is full of water would not be news. But, in the case of Australia's Lake Eyre, it is. The island-continent's "biggest body of water" is normally bone dry the year round. Now, two successive winters of unprecedented rainfall have filled the lake brimful for the first time in recorded history.

More important than filling the lake, the ample waters are providing additional natural irrigation for the "channel country" to the northeast. There, in the borderlands between South Australia and Queensland, the normal meager drainage from the Great Artesian Basin permits only a brief growing period for native grasses. Today's lush pasturage is a welcome sight for cattlemen from the "outback" who halt their herds there for fattening on the long trek to market.

All Characteristics of a Lake but Water

The lake lies in the State of South Australia and measures half again larger than Utah's Great Salt Lake. For years on end it is a dry salt pan 39 feet and more below sea level. It is mapped as a big lake in deference to scientists who say it "has all the characteristics of a lake except water."

Five inches or less is the average annual rainfall for the lake region. An inch or two more normally falls on the vast inland plain whose thirsty watercourses converge on Lake Eyre from the northeast.

Enough rainfall usually occurs some time between March and August, however, to provide a brief season when the shallow gullies overflow. Flooding waters of the Bulloo, the Barcoo (Cooper's Creek), the Georgina, and the Diamantina, running in thousands of tiny channels, irrigate the plain. Lush grasses spring up—ideal pasture for fattening cattle.

Only in rare years—1890, 1918, 1949, and 1950 are examples—have the rains been so far above average that the waters have irrigated the channeled plain of southwest Queensland and flowed on to settle in Lake Eyre's white salt pan. In two years, if rainfall drops back to normal, evaporation will return the lake to its accustomed desolation.

Natural Irrigation System

To the Honorable Richard G. Casey, Australia's Minister for National Development, the channel country is one of the wonders of the world. Where else does a vast semiarid area (about twice the size of New Jersey) have a productive irrigation system created by nature, not by man? It was Mr. Casey, popular minister to the United States from 1940 to 1942, who, following a recent flight over Lake Eyre's 3,700-square-mile expanse, spread the word that it was full.

Mr. Casey recently reported in a *Melbourne Herald* article that at present Queensland's self-irrigating channel country is a great asset little used. Many more cattle could be brought there for final fattening, even in years of average rain, if transportation from northern breeding areas and to the packing centers were improved, and if steps were taken to insure some flooding control.

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and slopes were terraced to make narrow stair-stepping irrigated fields.

Since 1909, the Southern Railway of Peru has connected Cusco with Mollendo on the Pacific coast via the Lake Titicaca region. The 506-mile route crosses the Andes ridge at 14,665 feet.

Cusco is capital of Peru's Illinois-sized province of the same name. It is a farm center in the approximate region where the white potato was first known. Grains make the plateau the breadbasket of the nation. The stricken city has several small flour mills; soap, candle, chocolate, and spaghetti factories; potteries and textile plants.

NOTE: Cusco may be located on the National Geographic Society's map of South America. Write the Society's headquarters, Washington 6, D. C., for a map price list.

For further information, see "Peru, Homeland of the Warlike Inca," in the *National Geographic Magazine* for October, 1950; "The Pith of Peru," August, 1942*; and "The Incas: Empire Builders of the Andes," February, 1939*. *(Issues marked with an asterisk are included on a special list of Magazines available to teachers in packets of ten for $1.00; issues unmarked are available at 50¢ a copy.)*

See also, in the GEOGRAPHIC SCHOOL BULLETINS, November 8, 1948, "New Road Approaches Ancient Machu Picchu."

KIP ROSS

EARTHQUAKE VICTIMS LIVE IN TEMPORARY SHACKS IN CUSCO'S CENTRAL PLAZA DE ARMAS

950 Years of Transatlantic Trail Blazing

THE narrowing Atlantic Ocean, further reduced to pond size by the latest jet-plane flying feats, never fails to challenge the men who blaze transportation trails. Its full width from Old World to New has served as a proving ground for man and craft for nearly a thousand years.

History's first non-stop transatlantic jet-plane flights made the distance between Europe and America in 10 hours and two minutes. The feat was performed last month by two United States Air Force flyers who complained of the slow time. One landed at Limestone Air Force Base, Maine; the other had to bail out in Labrador short of his United States goal (illustration, next page). Two years ago, six British Vampires had pioneered the jet trail from England to Labrador, making refueling stops in the Hebrides, Iceland, and Greenland.

Norse Made First Crossings

Christopher Columbus and Charles Lindbergh contributed the best known chapters to the Atlantic conquest record book. Aerial "firsts" have been predominant since 1919—eight years before Lindbergh's success electrified a tensely waiting world.

A century ago the widely accepted view was that Columbus wrote Chapter One. Subsequent study of Icelandic sagas revised that belief. It is now generally agreed that the story of Atlantic crossings goes back at least to the turn of the first Christian millennium—A.D. 1,000—nearly five centuries before Columbus's day.

Norsemen in deckless boats, using oars and a single square sail, reached southern Greenland about 982. From their small colony there, Leif Ericson and his men pushed westward to the place they called Vinland on the New World coast. This is believed to be somewhere in the region of Nova Scotia or New England.

Columbus sailed from Palos, Spain, on August 3, 1492, reaching a landfall in the West Indies on October 12. John Cabot, like Columbus a Genoese, five years later became the first since the Norsemen to find the continent, touching what is now Nova Scotia soil after a voyage of 52 days from Bristol, England.

First Transatlantic Steamer Had Sails

The Pilgrim Fathers, sailing from Plymouth, England, early in September, 1620, took almost as long as Columbus to span the ocean, reaching Cape Cod's tip on November 9. Fast crossings waited two centuries for the Yankee clipper ships, the *Dreadnaught* making a 12-day sailing record from New York to Ireland in 1859.

The first steamship to cross the Atlantic was the *Savannah* in 1819. Actually, it moved by wind more than by steam, being full-rigged. Its single steam engine, turning side paddles, was used only about one-eighth of the time during the 27-day voyage.

It was not until after the Civil War that propeller-driven steamships began lopping days off the Yankee clipper record time. The ill-fated

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Many of Australia's 15,000,000 cattle (illustration, below) are bred on the Barkly Tableland near the Gulf of Carpentaria. Steers are herded from there southward as much as 1,000 miles in a four-month trek along government-maintained stock routes to arrive in the channel country when the grasses are lush.

Fattened for a few weeks, they may still have a hike of several days to a railhead that leads to the packer. If they are destined for export, chances are they have 13,000 ocean miles to move in their processed form, since the United Kingdom takes most of Australia's spare beef.

NOTE: Lake Eyre is shown on the Society's map of Australia.

For additional information, see "Beyond Australia's Cities," in the *National Geographic Magazine* for December, 1936; and "Capital Cities of Australia," December, 1935; see also, in the GEOGRAPHIC SCHOOL BULLETINS, April 3, 1950, "Australia Suggests Boomerang for Olympics"; and "River Project to Water Dry Australian Acres," December 19, 1949.

W. ROBERT MOORE

AUSTRALIAN COWBOYS START COWFLESH ON A LONG TRIP THAT MAY END IN A LONDON RESTAURANT

"Back of beyond" in west Queensland, wranglers eat dust and keep cattle moving toward the railhead. Their 10-gallon hats are a recent style, borrowed from the American West. Other practices differ. Lariats are never used; the beasts are penned for branding. Rustling is rare. When it does occur it is known as "duffing." Herds are called "mobs," ranches are "stations."

Proper "Farming" to Assure Sequoia's Future

CALIFORNIA'S "immortal sequoia," a tree that defies the wear of time and nature, now is to have further protection against the only enemy it cannot resist—mankind.

The towering redwood, or *Sequoia sempervirens*, has been added to the list of trees the lumber industry plans to increase by means of a tree-farm program. Trees to be cut will be carefully selected. Many will be left standing to re-seed the cut-over areas. Thus the forest will perpetuate itself and be a continual source of mature timber.

Resists Fire, Fungus, and Insects

Cones dropped from redwoods produce seedlings which spring up with vigor in their foggy home along the coast of northern California. Moreover, the tree is so hardy that even the stumps of those felled sometimes put forth sprouts which grow to large size.

Because of this sturdy growth, plus a strong resistance to attack by fire, fungus disease, and insects, forestry experts believe that redwood logging can be made to pay for itself.

The sequoia is an evergreen. It often is called the oldest living thing —and the biggest. There are two species native only to California— the coastal redwood and its elder cousin, the *Sequoia gigantea*. The latter is found on the westward slopes of the Sierra Nevada at heights of 4,500 to 8,000 feet. A third species, once thought to be extinct, has been discovered in recent years in China.

The seacoast variety lives in a relatively narrow forest belt stretching from the San Francisco area northward into southern Oregon. It sometimes reaches an age of more than 2,000 years. The largest specimen known, 364 feet high, is the tallest tree in the world. It stands at Dyerville Flat, in Humboldt County, California.

Redwood Is Useful Lumber for Tropics

By comparison, the mountain-dwelling relative seems stunted, as the tallest is only 272 feet high. However, these trees are older and bulkier. One of them, the famous General Sherman in the Giant Forest, Tulare County, is thought to be more than 3,500 years old. Its diameter at the base is more than 36 feet—16 feet greater than the biggest coastal sequoia.

Only the redwood of the lowlands has commercial value; the wood of the mountain monarchs is too brittle for use as building lumber. In trees used commercially, the heartwood is a beautiful red. An abundance of tannin, a natural preservative, gives the wood resistance to decay. For this reason, redwood is in particular demand for use in the tropics where dampness and many insects have a disastrous effect on most woods.

Fossil specimens indicate that the sequoia's history dates back 140 million years to the age of the dinosaurs. The trees once flourished in many lands but they nearly died out with the advance of the ice age.

In 1851, pioneers brought to San Francisco word of the skyscraping trees, and lumbermen enacted a "red gold rush" on the coastal redwoods.

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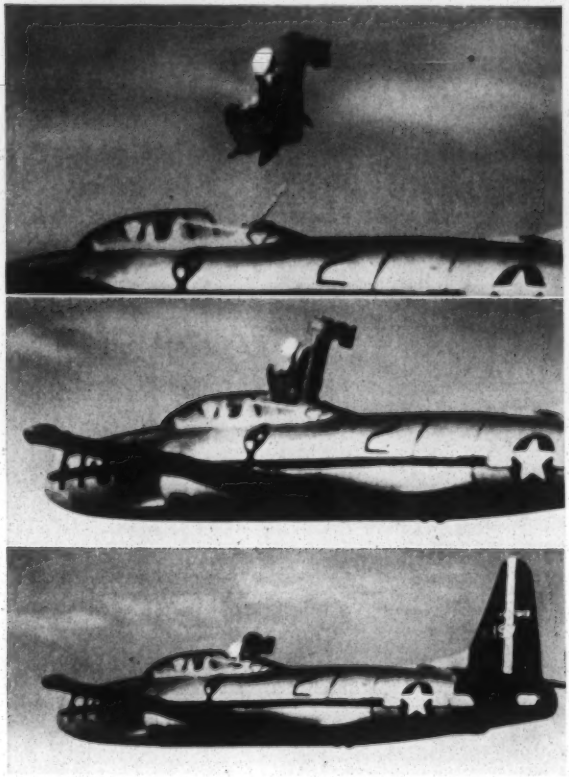
Lusitania, in 1910, was the first to cross the Atlantic in under five days. Britain's present-day *Queen Mary* has made surface crossing three times in under four days.

Ten months prior to United States entry into World War I, Germany dispatched from the North Sea island of Helgoland the first cargo submarine to cross. Entering the Chesapeake Bay after a 16-day run, it exchanged cargoes at Baltimore, and got back safely to Germany after running the British blockade in a 22-day return trip.

The transatlantic air parade began in earnest in 1919, employing aviation advances attributable to the war then just ended. In May, United States Navy Lieutenant Commander Albert C. Read and a five-man crew successfully flew the hydroplane *NC-4* from New York to Plymouth, England, via Newfoundland, the Azores, and Lisbon, Portugal.

Then, on June 14-15, Britain's Alcock and Brown in their Vickers biplane made the first non-stop Atlantic crossing by air—from Newfoundland to Ireland in 16 hours and 20 minutes. In July, the British dirigible *R-34* made the first lighter-than-air crossing and the first aerial round trip. It flew from Scotland to New York, and returned after a few days to England.



U.S. AIR FORCE, OFFICIAL

A TEST PILOT DEMONSTRATES THE JET FIGHTER EJECTION SEAT

Jet planes travel so fast that pilots cannot bail out in ordinary fashion. A powder charge blows man and seat 60 feet out of the cockpit in one second. The seat drops and the pilot parachutes to earth. This device saved the life of the transatlantic jet flyer who recently ran out of fuel over Labrador.

Following Lindbergh's dramatic first—the solo flight from New York to Paris on May 20, 1927—aviation's lid was off. The succession of achievements in distance flying over the years has dwarfed the Atlantic and even the globe, numbing the public mind to the ever greater marvels performed.

NOTE: See also, in the *National Geographic Magazine*, October, 1950, "Flying in the 'Blowtorch' Era"; "Our Air Age Speeds Ahead," February, 1948; and "New Frontier in the Sky," September, 1946.

Bulletin No. 5, October 23, 1950

Kashmir Floods Spare Wool-Producing Goats

GREAT floods in the Vale of Kashmir have brought large-scale suffering and destruction to one of Asia's beauty spots. The rampaging Jhelum River spread across the valley, leaving only treetops visible. For a while the waters threatened Srinagar, capital of the State of Jammu and Kashmir in northern India.

Most damage was suffered by crop farmers. The area's distinctive product, Kashmir (cashmere) wool, was relatively untouched, for the goats from which the wool is taken graze at higher elevations. This was fortunate in view of the fact that there is a fast-rising world-wide market for fine-quality wools.

Famous for Shawls

Kashmir wool is the soft winter underfleece of the small, semiwild Tibet, or Kashmir, goat, a frugal animal which grazes in the thin air and feeds on the thin fare of the Himalaya highlands. Never shorn, the wool is plucked or combed out painstakingly by hand during the spring molt. It is collected, also, from shrubs and rocks against which the animal rubs when its downy underwear becomes too warm.

Kashmir gave the wool its name but the goats from which it comes now are found from the Caspian Sea to western China. Their wool is finest in regions of perpetual snow near the eastern limit of this range. The Kashmir name took hold because of the long renown of scarves and shawls hand-woven from it at Srinagar. Today the famous scarves no longer are made in Kashmir, but the Kashmiri use the wool for making a few rugs and wall hangings (illustrations, cover and next page).

Shawls known to the Caesars were loomed in the storied and beautiful Vale of Kashmir. Of matchless softness, they were hand-worked on the loom into masterpieces of blended color. Superb examples are displayed in Srinagar museums.

The collapse of the Roman Empire disrupted the trade in the "wool of emperors." But early in the 16th century, Europe "rediscovered" Srinagar's exquisite shawls. Later, Josephine and Eugénie, consorts of two Napoleons, multiplied the vogue. Shawl weaving in the Vale burgeoned into an industry of 25,000 workers and 16,000 looms a century ago.

Yield Uncertain; Supply Difficult

Srinagar's unique industry waned abruptly with the Franco-German War of 1870. The French, required to pay heavy indemnity after that war, had no money for delicate shawls. Moreover, by that time Britain had made textiles the keystone of its industrial revolution, and was processing raw Kashmir wool into a wide range of garments for men and women. The Paisley shawl, a frank imitation, was developed in Paisley, Scotland. Mills in the United States, Austria, and elsewhere have since turned to processing the downy goat fiber.

Inner Asia's output of the wool never has been really large. Each year's yield is uncertain, with the rigors of Himalayan transportation—not to mention wars and revolutions—adding to the difficulties of supply.

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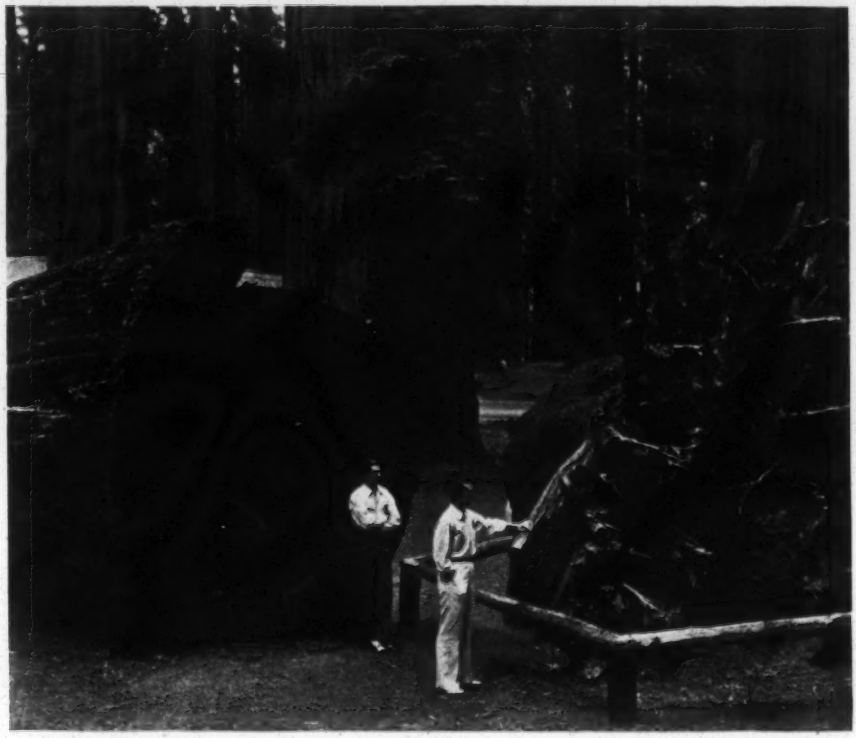
In the century since, more than a third of the primeval forests have been cut. However, conservation has advanced steadily and many of the finest redwood stands are now under public protection.

There are about 70 groves of the Sierra titans. Large areas now are part of the National Park system, including the Giant Forest of Sequoia National Park. Members of the National Geographic Society helped save this tract by contributing some $100,000 toward its purchase.

In primeval form the forests are a wonderland of massive columns through which the sunshine filters to a ground carpet of huge ferns, pink rhododendrons, and many other plants. Park rangers say visitors usually are awed by the sight, and a frequent remark is, "To cut these trees would be like desecrating a cathedral."

NOTE: Regions where the sequoia grows may be located on the Society's map of the Southwestern United States.

For further information see "California's Coastal Redwood Realm," in the *National Geographic Magazine* for February, 1939*; and "Among the Big Trees of California," August, 1934.



B. ANTHONY STEWART

RINGS ON THIS FALLEN FOREST GIANT ARE A CALENDAR OF EVENTS OF 12 CENTURIES

When this sequoia fell, in 1933, these sections were sawed off and preserved in Richardson Grove, in California's Humboldt County. Every year they give a graphic lesson in history and natural history to hundreds of visitors who motor along the Redwood Highway. The mass of torn roots (right) is marked to show how the tree shot out new roots at new ground levels after a series of violent floods had submerged its base in mud. On the sawed-off end of the stump markers on the tree's rings indicate historical events which took place during the sequoia's long life, which began nearly three centuries before the Norsemen came to America.

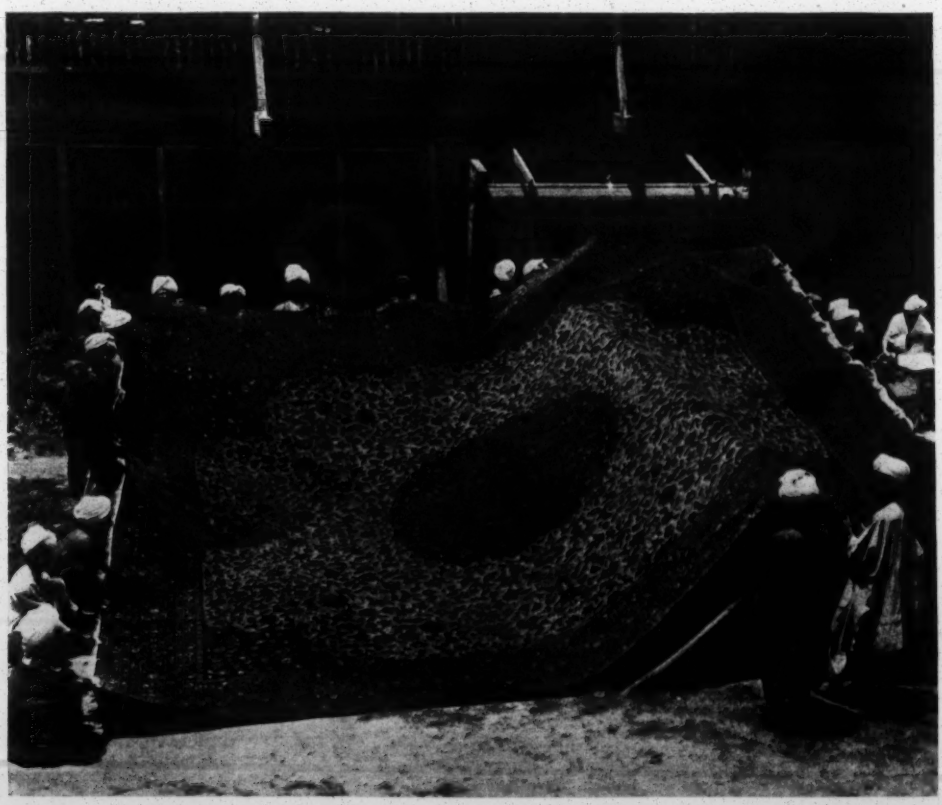
Goatherds, coolies, yaks, camels, and horses carry the raw product across the plateaulands down to navigable rivers. Dragon-shaped junks then move the bales to ports touched by Western steamers. The harvest is often in transit for a full year or more.

The white variety is scarcest and most in demand. Gray and brownish gray are other natural shades. Each goat yields two to four ounces, little compared to the 12-pound fleece of some sheep. A goat's-wool sweater may represent the yield of six or more animals, while the wool of 30 might be required in an overcoat.

NOTE: The state of Jammu and Kashmir may be located on the Society's map of India and Burma.

For additional information, see "The Idyllic Vale of Kashmir," in the *National Geographic Magazine* for April, 1948; "Delhi, Capital of a New Dominion," November, 1947*; "India Mosaic," April, 1946; "India—Yesterday, Today, and Tomorrow," October, 1943*; "First Over the Roof of the World by Motor," March, 1932; and "House-Boat Days in the Vale of Kashmir," October, 1929.

See also, in the GEOGRAPHIC SCHOOL BULLETINS, January 30, 1950, "Jammu and Kashmir People Await Plebiscite"; and "Glacier-Framed Kashmir Is Pawn in Struggle," December 13, 1948.



HERFORD TYNES COWLING

A FINISHED KASHMIR RUG, FRESH FROM THE LOOM, IS SPREAD IN ALL ITS BEAUTY

The basic material for this carpet is pashm, the Kashmiri word for the soft under wool of a highland goat. Formerly this wool went into shawls, then it was used for carpets, and now most of it is exported for use in fine clothing.